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ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,850	FLAHAUT, DOMINIQUE	
	Examiner	Art Unit	
	Jessee Roe	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 April 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-61 is/are pending in the application.

4a) Of the above claim(s) 23-54 and 56-59 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-13,15,16 and 20 is/are rejected.

7)☒ Claim(s) 4,17-19,21,22,55,60 and 61 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 16 August 2005.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 1-22 and claims 55, 60 and 61 as they depend from claims 1-22, drawn to a nickel-chromium-iron alloy having at least one carbide forming element more stable than chromium carbide with hafnium oxide particles, are currently under examination. Because the Applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP §818.03(a)). Claims 23 and 52-53 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected nickel-chromium-iron alloy with up to 5% hafnium. Claim 24 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected nickel-chromium-iron alloy with up to 5 weight percent hafnium and hafnium oxide particles. Claim 25 is withdrawn from further consideration pursuant 37 CFR 1.142(b) as being drawn to a nonelected nickel-chromium-aluminum-iron alloy with hafnium particles. Claims 26-34 and claims 37-38, 45 and 48-50 as they depend from claim 26 is withdrawn from further consideration pursuant 37 CFR 1.142(b) as being drawn to a method of manufacturing a nickel-chromium iron alloy by adding finely divided hafnium particles to a melt to form oxides. Claims 35 and 37-38, 45 and 48-50 as they depend from claim 35 are withdrawn from further consideration pursuant 37 CFR 1.142(b) as being drawn to a method of manufacturing a nickel-chromium-iron alloy by adding finely divided hafnium particles and varying the

level of oxygen in the melt. Claims 36 and 37-38, 45 and 48-50 are withdrawn from further consideration pursuant 37 CFR 1.142(b) as being drawn to a method of manufacturing a nickel-chromium-iron alloy by reducing detrimental oxide formed from titanium, zirconium, and aluminum. Claims 39-41 and 45 and 48-50 are withdrawn from further consideration pursuant 37 CFR 1.142(b) as being drawn to a method of manufacturing an oxide dispersion nickel-chromium-iron alloy by using hafnium particles to control gas compositions and permit oxidation of hafnium in situ. Claims 42-43 and 44-45 and 48-50 as they depend from claims 42-43 are withdrawn from further consideration pursuant 37 CFR 1.142(b) as being drawn to a method of manufacturing an oxide dispersion nickel-chromium-iron alloy by performing oxidation of beneficial oxide dispersion as hafnium oxide and avoiding detrimental precipitates. Claim 51 is withdrawn from consideration pursuant 37 CFR 1.142(b) as being drawn to a method of manufacturing a nickel-chromium-iron alloy by adding hafnium particles to a melt before pouring. Claim 56 is withdrawn from consideration pursuant 37 CFR 1.142(b) as being drawn to a nickel-chromium-iron alloy “having a structure and composition substantially as described and illustrated in any one of Figures 1 to 4 of the accompanying Drawings, wherein the tables represent percentages by weight of the alloy constituents.”. Claim 57 is withdrawn from consideration pursuant 37 CFR 1.142(b) as being drawn to a nickel-chromium-iron alloy “having a structure substantially as described and illustrated in Figures 5 or 6 of the accompanying Drawings.".

Claim Objections

Claims 14, 17-19, 21-22, 55, 60 and 61 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot serve as a basis for another multiple dependent claim. See MPEP § 608.01(n). Accordingly, claims 14, 17-19, 21-22, 55, 60 and 61 have not been further treated on the merits.

Claim 4 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 4 recites "Cobalt 2.05% max." in line 13 of claim 4 whereas claim 1 recites "Cobalt 0 – 2.0%" in line13 of claim 1. Thus, claim 4 would not further limit claim 1 because the range of the cobalt specified in claim 4 would be broader than the range specified in claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte*

Wu, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 20 recites the broad recitation “with the proviso that at least one of niobium, titanium and zirconium is present”, and the claim also recites specific values for each of niobium, titanium and zirconium, for instance lines 11 and 13-14 on page 32, which would be narrower statements of the range/limitation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klöwer (US 5,851,318) with evidence from Deevi et al. (Exo-Melt^{TM} process for melting and casting intermetallics).in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide

additions).

In regards to claim 1, Klöwer (‘318) discloses a nickel-chromium-iron alloy composition having high temperature corrosion resistant properties (col. 1, line 60 – col. 2, line 40). The table below provides the relative comparison of the alloy disclosed by Klöwer (‘318) with the alloy of the instant invention.

Element	**Instant Claims (weight percent)**	**Klöwer (‘318) (weight percent)**	**Overlap (weight percent)**
C	0.01 – 0.7	0 – less than 0.05	0.01 – less than 0.05
Si	0.1 – 3.0	0 – less than 0.5	0.1 – less than 0.5
Mn	0 – 2.5	0 – less than 0.5	0 – less than 0.5
Ni	15 – 90	Balance	about 49 – about 63
Cr	5 – 40	4 – 10	5 – 10
Mo	0 – 3.0	0	0
Nb	0 – 2.0	0	0
Ta	0 – 2.0	0	0
Ti	0 – 2.0	0 – less than 0.5	0 – less than 0.5
Zr	0 – 2.0	0.025 – 0.2	0.025 – 0.2
Co	0 – 2.0	0	0
W	0 – 4.0	0	0
Hf	0.01 – 4.5	0.025 – 0.2	0.025 – 0.2
Al	0 – 15	8.5 – 11	8.5 – 11
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance (greater than 0 – 79.878)	23 – 28	23 – 28

Klöwer (‘318) discloses a nickel-chromium-iron alloy composition that would be made by melting and casting (col. 4, lines 52-67) as shown above, but Klöwer (‘318) does not specify the amounts of impurities (nitrogen and oxygen) that would be expected from casting.

Deevi et al. discloses nickel-based alloys having high temperature corrosion made by melting and conventional casting techniques that would have 0.013 weight percent oxygen and 0.013 weight percent nitrogen (page 17, column 2 and page 25, column 2).

Therefore, it would be expected that the nickel-chromium-iron alloy made by melting and casting, as disclosed by Klöwer (‘318), would also have 0.013 weight percent oxygen and 0.013 weight percent nitrogen, as disclosed by Deevi et al., because Deevi et al. teaches that melting and casting would result in the occurrence of impurities such as oxygen and nitrogen in the above specified amounts (page 17, column 2 and page 25, column 2).

Klöwer (‘318) with evidence from Deevi et al. discloses an alloy composition having titanium and/or zirconium present as shown above, but Klöwer (‘318) with evidence from Deevi et al. does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to alloys that would be used in high temperature environments such as turbines in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Klöwer (‘318) with evidence from Deevi et al., in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 10, Klöwer ('318) discloses up to less than 0.05 weight percent carbon, which overlaps the range of 0.03 to 0.2 weight percent carbon as instantly claimed.

In regards to claim 15, Klöwer ('318) discloses 8.5 to 11 weight percent aluminum and 0.025 to 0.2 weight percent hafnium, which overlap the ranges of 0.1 to 10 weight percent aluminum and 0.01 to 4.5 weight percent hafnium as instantly claimed.

Claims 1, 9, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleeman (US 6,409,847) with evidence from Deevi et al. (Exo-Melt^{TM} process for melting and casting intermetallics).and http://dictionary.reference.com/browse/superalloy in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

In regards to claim 1, Kleeman ('847) discloses a nickel-chromium-iron alloy composition having high hot strength (abstract). The table below provides the relative comparison of the alloy disclosed by Kleeman ('847) with the alloy of the instant invention.

Element	**Instant Claims (weight percent)**	**Kleeman ('847) (weight percent)**	**Overlap (weight percent)**
C	0.01 – 0.7	0.3 – 1.0	0.3 – 0.7
Si	0.1 – 3.0	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0 – 0.8	0 – 0.8
Ni	15 – 90	30 – 48	30 – 48
Cr	5 – 40	16 – 22	16 – 22
Mo	0 – 3.0	1.5 – 4.0	1.5 – 3.0
Nb	0 – 2.0	0.2 – 0.6	0.2 – 0.6
Ta	0 – 2.0	0.1 – 1.5	0.1 – 1.5

Element	Instant Claims (weight percent)	Kleeman ('847) (weight percent)	Overlap (weight percent)
Ti	0 – 2.0	0.1 – 0.5	0.1 – 0.5
Zr	0 – 2.0	0.1 – 0.6	0.1 – 0.6
Co	0 – 2.0	0.5 – 18	0.5 – 2.0
W	0 – 4.0	0	0
Hf	0.01 – 4.5	0.1 – 1.5	0.1 – 1.5
Al	0 – 15	1.5 – 2.5	1.5 – 2.5
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	more than 30	Balance

Kleeman ('847) discloses a nickel-chromium-iron alloy composition that would be made by melting and casting (col. 2, lines 39-46) as shown on the previous page, but Kleeman ('847) does not specify the amounts of impurities (nitrogen and oxygen) that would be expected from casting.

Deevi et al. discloses nickel-based alloys having high temperature corrosion made by melting and conventional casting techniques that would have 0.013 weight percent oxygen and 0.013 weight percent nitrogen (page 17, column 2 and page 25, column 2).

Therefore, it would be expected that the nickel-chromium-iron alloy made by melting and casting disclosed by Kleeman ('847), would also have 0.013 weight percent oxygen and 0.013 weight percent nitrogen, as disclosed by Deevi et al., because Deevi et al. teaches that melting and casting would result in the occurrence of impurities such as oxygen and nitrogen in the above specified amounts (page 17, column 2 and page 25, column 2).

Kleeman ('847) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition with oxygen and nitrogen impurities as shown above, but Kleeman ('847) with evidence from Deevi et al. does not specify that

the nickel-chromium-iron alloy composition would be a superallloy.

http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures.

Thus, the nickel-chromium-iron alloy disclosed by Kleeman (‘847) with evidence from Deevi et al., would be a superalloy because http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures and the nickel–chromium-iron alloy disclosed by Kleeman (‘847) with evidence from Deevi et al. would meet both prongs of the definition of a “superalloy”.

Kleeman (‘847) with evidence from Deevi et al. and http://dictionary.reference.com/browse/superalloy discloses a nickel-chromium-iron alloy composition having niobium, titanium and zirconium present as shown above, but Kleeman (‘847) with evidence from Deevi et al. and http://dictionary.reference.com/browse/superalloy does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments such as turbines in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Kleeman (‘847) with evidence from Deevi et al. and http://dictionary.reference.com/browse/superalloy, in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 9, Kleeman (‘847) discloses 0.3 to 1.0 weight percent carbon, which reads on the range of 0.3 to 0.5 weight percent carbon, as instantly claimed.

In regards to claim 11, Kleeman (‘847) discloses 0.3 to 1.0 weight percent carbon and 0.1 to 1.5 weight percent hafnium, which overlap the ranges of 0.3 to 0.6 weight percent carbon and 0.01 to 3.0 weight percent hafnium as instantly claimed.

In regards to claim 12, Kleeman (‘847) discloses 0.3 to 1.0 weight percent carbon and 0.1 to 1.5 weight percent hafnium, which read on the ranges of 0.3 to 0.6 weight percent carbon and 0.1 to 1.0 weight percent hafnium as instantly claimed.

In regards to claim 13, Kleeman (‘847) discloses 0.3 to 1.0 weight percent carbon and 0.1 to 1.5 weight percent hafnium, which read on the ranges of 0.3 to 0.6 weight percent carbon and 0.2 to 0.5 weight percent hafnium as instantly

claimed.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kleeman (US 6,409,847) with evidence from http://dictionary.reference.com/browse/superalloy in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

In regards to claim 2, Kleeman ('847) discloses a nickel-chromium-iron alloy composition having high hot strength (abstract). The table below provides the relative comparison of the alloy disclosed by Kleeman ('847) with the alloy of the instant invention.

Element	**Instant Claims (weight percent)**	**Kleeman ('847) (weight percent)**	**Overlap (weight percent)**
C	0.01 – 0.5	0.3 – 1.0	0.3 – 0.5
Si	0.01 – 3.0	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0 – 0.8	0 – 0.8
Ni	15 – 50	30 – 48	30 – 48
Cr	20 – 40	16 – 22	20 – 22
Mo	0 – 3.0	1.5 – 4.0	1.5 – 3.0
Nb	0 – 2.0	0.2 – 0.6	0.2 – 0.6
Ta	0 – 2.0	0.1 – 1.5	0.1 – 1.5
Ti	0 – 2.0	0.1 – 0.5	0.1 – 0.5
Zr	0 – 2.0	0.1 – 0.6	0.1 – 0.6
Co	0 – 2.0	0.5 – 18	0.5 – 2.0
W	0 – 4.0	0	0
Hf	0.01 – 4.5	0.1 – 1.5	0.1 – 1.5
Fe	Balance	more than 30	Balance

The Examiner notes that the amounts of carbon, silicon, manganese, nickel, chromium, molybdenum, niobium, tantalum, titanium, zirconium, cobalt, tungsten, hafnium and iron disclosed by Kleeman ('847) overlap the amounts claimed in the instant invention, which is prima facie

evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amounts of carbon, silicon, manganese, nickel, chromium, molybdenum, niobium, tantalum, titanium, zirconium, cobalt, tungsten, hafnium and iron from the amounts disclosed by Kleeman (‘847) because Kleeman (‘847) discloses the same utility throughout the disclosed ranges.

Kleeman (‘847) discloses a nickel-chromium-iron alloy composition as shown above, but Kleeman (‘847) does not specify that the nickel-chromium-iron alloy composition would be a superallloy.

http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures.

Thus, the nickel-chromium-iron alloy disclosed by Kleeman (‘847), would be a superalloy because http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures and the nickel–chromium-iron alloy disclosed by Kleeman (‘847) would meet both prongs of the definition of a “superalloy”.

Kleeman (‘847) with evidence from http://dictionary.reference.com/browse/superalloy discloses a nickel-chromium-iron alloy composition having niobium, titanium and zirconium present as shown above, but Kleeman (‘847) with evidence from http://dictionary.reference.com/browse/superalloy does not specify "that at least

part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Kleeman ('847) with evidence from http://dictionary.reference.com/browse/superalloy, in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Claims 1, 10 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barraclough (GB 2 083 499) with evidence from Deevi et al. (Exo-Melt^{TM} process for melting and casting intermetallics).and http://dictionary.reference.com/browse/superalloy in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

In regards to claim 1, Barraclough (GB '499) discloses a nickel-chromium-iron alloy composition having hot strength (abstract). The table below page provides the relative comparison of the alloy disclosed by Barraclough (GB '499)

with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Barraclough (GB '499) (weight percent)	Overlap (weight percent)
C	0.01 – 0.7	0.02 – 0.15	0.02 – 0.15
Si	0.1 – 3.0	0.2 – 2.0	0.2 – 2.0
Mn	0 – 2.5	0.2 – 2.0	0.2 – 2.0
Ni	15 – 90	15 – 20	15 – 20
Cr	5 – 40	15 – 25	15 – 25
Mo	0 – 3.0	0	0
Nb	0 – 2.0	0	0
Ta	0 – 2.0	0	0
Ti	0 – 2.0	0.1 – 0.8	0.1 – 0.8
Zr	0 – 2.0	optional (0 – 0.8)	optional (0 – 0.8)
Co	0 – 2.0	0	0
W	0 – 4.0	0	0
Hf	0.01 – 4.5	0 – 0.8	0.01 – 0.8
Al	0 – 15	2 – 4	2 – 4
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	Balance	Balance

Barraclough (GB '499) discloses a nickel-chromium-iron alloy composition that would be made by melting and casting (abstract and page 1, lines 39-50) as shown above, but Barraclough (GB '499) does not specify the amounts of impurities (nitrogen and oxygen) that would be expected from casting.

Deevi et al. discloses nickel-based alloys having high temperature corrosion made by melting and conventional casting techniques that would have 0.013 weight percent oxygen and 0.013 weight percent nitrogen (page 17, column 2 and page 25, column 2).

Therefore, it would be expected that the nickel-chromium-iron alloy made by melting and casting, as disclosed by Barraclough (GB '499), would also have 0.013 weight percent oxygen and 0.013 weight percent nitrogen, as disclosed by Deevi et al., because Deevi et al. teaches that melting and casting would result in

the occurrence of impurities such as oxygen and nitrogen in the above specified amounts (page 17, column 2 and page 25, column 2).

Barraclough (GB '499) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition with oxygen and nitrogen impurities as shown above, but Barraclough (GB '499) with evidence from Deevi et al. does not specify that the nickel-chromium-iron alloy composition would be a superallloy.

http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures.

Thus, the nickel-chromium-iron alloy disclosed by Barraclough (GB '499) with evidence from Deevi, would be a superalloy because http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures and the nickel–chromium-iron alloy disclosed by Barraclough (GB '499) with evidence from Deevi would meet both prongs of the definition of a “superalloy”.

Barraclough (GB '499) with evidence from Deevi et al. and http://dictionary.reference.com/browse/superalloy discloses a nickel-chromium-iron alloy composition having titanium and/or zirconium present as shown above, but Barraclough (GB '499) with evidence from Deevi et al. and http://dictionary.reference.com/browse/superalloy does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Barraclough (GB '499) with evidence from Deevi et al. and http://dictionary.reference.com/browse/superalloy, in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 10, Barraclough (GB '499) discloses 0.02 to 0.15 weight percent carbon, which overlaps the range of 0.03 to 0.2 weight percent carbon as instantly claimed.

In regards to claim 15, Barraclough (GB '499) discloses 2 to 4 weight percent aluminum and 0 to 0.8 weight percent hafnium, which overlap the ranges of 0.1 to 10 weight percent aluminum and 0.01 to 4.5 weight percent hafnium as instantly claimed.

In regards to claim 16, Barraclough (GB '499) discloses 2 to 4 weight percent aluminum and 0 to 0.8 weight percent hafnium, which overlap the ranges of 0.1 to 6 weight percent aluminum and 0.1 to 1.0 weight percent hafnium as instantly claimed

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barraclough (GB 2 083 499) with evidence from http://dictionary.reference.com/browse/superalloy in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

In regards to claim 2, Barraclough (GB '499) discloses a nickel-chromium-iron alloy composition having high hot strength (abstract). The table below provides the relative comparison of the alloy disclosed by Barraclough (GB '499) with the alloy of the instant invention.

Element	**Instant Claims (weight percent)**	**Barraclough (GB '499) (weight percent)**	**Overlap (weight percent)**
C	0.01 – 0.5	0.02 – 0.15	0.02 – 0.15
Si	0.01 – 3.0	0.2 – 2.0	0.2 – 2.0
Mn	0 – 2.5	0.2 – 2.0	0.2 – 2.0
Ni	15 – 90	15 – 20	15 – 20
Cr	20 – 40	15 – 25	15 – 25
Mo	0 – 3.0	0	0
Nb	0 – 2.0	0	0
Ta	0 – 2.0	0	0
Ti	0 – 2.0	0.1 – 0.8	0.1 – 0.8
Zr	0 – 2.0	optional (0 – 0.8)	optional (0 – 0.8)
Co	0 – 2.0	0	0
W	0 – 4.0	0	0
Hf	0.01 – 4.5	0 – 0.8	0.01 – 0.8
Fe	Balance	Balance	Balance

The Examiner notes that the amounts of carbon, silicon, manganese, nickel, chromium, molybdenum, niobium, tantalum, titanium, zirconium, cobalt, tungsten, hafnium and iron disclosed by Barraclough (GB '499) overlap the amounts claimed in the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of

ordinary skill in the art at the time the invention was made to have selected the claimed amounts of carbon, silicon, manganese, nickel, chromium, molybdenum, niobium, tantalum, titanium, zirconium, cobalt, tungsten, hafnium and iron from the amounts disclosed by Barraclough (GB ‘499) because Barraclough (GB ‘499) discloses the same utility throughout the disclosed ranges.

Barraclough (GB ‘499) discloses a nickel-chromium-iron alloy composition as shown above, but Barraclough (GB ‘499) does not specify that the nickel-chromium-iron alloy composition would be a superallloy.

http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures.

Thus, the nickel-chromium-iron alloy disclosed by Barraclough (GB '499) would be a superalloy because http://dictionary.reference.com/browse/superalloy teaches that a superalloy would often have a nickel, nickel-iron, or cobalt base and be capable of withstanding high temperatures and the nickel–chromium-iron alloy disclosed by Barraclough (GB '499) would meet both prongs of the definition of a “superalloy”.

Barraclough (GB '499) with evidence from http://dictionary.reference.com/browse/superalloy discloses a nickel-chromium-iron alloy composition having titanium and/or zirconium present as shown above, but Barraclough (GB '499) with evidence from http://dictionary.reference.com/browse/superalloy does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Barraclough (GB '499) with evidence from http://dictionary.reference.com/browse/superalloy, in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Claims 1, 3-6, 8-13 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herchenroeder (GB 1 373 386) with evidence from Deevi et al. (Exo-Melt™ process for melting and casting intermetallics) in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

In regards to claim 1, Herchenroeder (GB ‘386) discloses a nickel-chromium-iron alloy composition having high hot strength (page 1, lines 12-25, page 1,line 43 – page 2, line 38). The table on the following page provides the relative comparison of the alloy disclosed by Herchenroeder (GB ‘386) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Herchenroeder (GB '386) (weight percent)	Overlap (weight percent)
C	0.01 – 0.7	0 – 1	0.01 – 0.7
Si	0.1 – 3.0	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0.5 – 2.0	0.5 – 2.0
Ni + Co	15 – 92	38 – 72	38 – 72
Cr	5 – 40	15 – 29	15 – 29
Mo	0 – 3.0	0 – 5	0 – 3.0
Zr+Ti+Nb+Hf	0.01 – 10.5	0 – 2.0	0.01 – 2.0
W	0 – 4.0	0 – 5	0 – 4.0
Al	0 – 15	0 – 0.22	0 – 0.22
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	12 – 35	Balance

Herchenroeder (GB '386) discloses a nickel-chromium-iron alloy composition that would be made by melting and casting (page 2, lines 39-65 and Examples I-II) as shown above, but Herchenroeder (GB '386) does not specify the amounts of impurities (nitrogen and oxygen) that would be expected from casting.

Deevi et al. discloses nickel-based alloys having high temperature corrosion made by melting and conventional casting techniques that would have 0.013 weight percent oxygen and 0.013 weight percent nitrogen (page 17, column 2 and page 25, column 2).

Therefore, it would be expected that the nickel-chromium-iron alloy made by melting and casting, as disclosed by Herchenroeder (GB '386), would also have 0.013 weight percent oxygen and 0.013 weight percent nitrogen, as disclosed by Deevi et al., because Deevi et al. teaches that melting and casting would result in the occurrence of impurities such as oxygen and nitrogen in the above specified amounts (page 17, column 2 and page 25, column 2).

Herchenroeder (GB ‘386) with evidence from Deevi et al. discloses a nickel-chromium-iron superalloy composition having niobium, titanium and zirconium present as shown above, but Herchenroeder (GB ‘386) with evidence from Deevi et al. does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Herchenroeder (GB ‘386) with evidence from Deevi et al., in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 3, Herchenroeder (GB ‘386) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (page 1, lines 12-25, page 1,line 43 – page 2, line 38). The table on the following page provides the relative comparison of the alloy disclosed by Herchenroeder (GB ‘386) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Herchenroeder (GB '386) with evidence from Deevi et al. (weight percent)	Overlap (weight percent)
C	0.3 – 0.7	0 – 1	0.3 – 0.7
Si	0.1 – 2.5	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0.5 – 2.0	0.5 – 2.0
Ni + Co	30 – 42	38 – 72	38 – 42
Cr	20 – 30	15 – 29	20 – 29
Mo	0 – 3.0	0 – 5	0 – 3.0
Zr+Ti+Nb+Hf	0.01 – 7.5	0 – 2.0	0.01 – 2.0
W	0 – 1.0	0 – 5	0 – 1.0
N	0.001 – 0.5	0.013	0.013
O	0.001 – 0.7	0.013	0.013
Fe	Balance	12 – 35	Balance

Still regarding claim 3, Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 4, Herchenroeder (GB '386) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (page 1, lines 12-25, page 1,line 43 – page 2, line 38). The table below provides the relative comparison of the alloy disclosed by Herchenroeder (GB '386) with the alloy of the instant inventin.

Element	Instant Claims (weight percent)	Herchenroeder (GB '386) with evidence from Deevi et al. (weight percent)	Overlap (weight percent)
C	0.03 – 0.2	0 – 1	0.03 – 0.2
Si	0.1 – 0.25	0.2 – 2.5	0.2 – 0.25
Mn	0 – 2.5	0.5 – 2.0	0.5 – 2.0
Ni + Co	30 – 42.05	38 – 72	38 – 42.05
Cr	20 – 30	15 – 29	20 – 29
Mo	0 – 3.0	0 – 5	0 – 3.0
Zr+Ti+Nb+Hf	0.01 – 8.2	0 – 2.0	0.01 – 2.0
W	0 – 1.0	0 – 5	0 – 1.0
N	0.001 – 0.5	0.013	0.013

Element	Instant Claims (weight percent)	Herchenroeder (GB ‘386) with evidence from Deevi et al. (weight percent)	Overlap (weight percent)
O	0.001 – 0.7	0.013	0.013
Fe	Balance	12 – 35	Balance

Still regarding claim 4, Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 5, Herchenroeder (GB ‘386) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (page 1, lines 12-25, page 1,line 43 – page 2, line 38). The table below provides the relative comparison of the alloy disclosed by Herchenroeder (GB ‘386) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Herchenroeder (GB ‘386) with evidence from Deevi et al. (weight percent)	Overlap (weight percent)
C	0.3 – 0.7	0 – 1	0.3 – 0.7
Si	0.01 – 2.5	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0.5 – 2.0	0.5 – 2.0
Ni + Co	40 – 62	38 – 72	38 – 62
Cr	30 – 40	15 – 29	-
Mo	0 – 3.0	0 – 5	0 – 3.0
Zr+Ti+Nb+Hf	0.01 – 8.5	0 – 2.0	0.01 – 2.0
W	0 – 1.0	0 – 5	0 – 1.0
N	0.001 – 0.5	0.013	0.013
O	0.001 – 0.7	0.013	0.013
Fe	Balance	12 – 35	Balance

The Examiner notes that the amounts of carbon, silicon, manganese, nickel, cobalt, molybdenum, zirconium, titanium, niobium, hafnium, tungsten, nitrogen, oxygen and iron disclosed by Herchenroeder (GB ‘386) with evidence

from Deevi et al. overlaps the claimed amounts of carbon, silicon, manganese, nickel, cobalt, molybdenum, zirconium, titanium, niobium, hafnium, tungsten, nitrogen, oxygen and iron of the instant invention. With respect to the claimed range of chromium, It has been held that "a prima facie case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties." MPEP 2144.05 I.

Herchenroeder (GB ‘386) with evidence from Deevi et al. discloses a nickel-chromium-iron superalloy composition having niobium, titanium and zirconium present as shown above, but Herchenroeder (GB ‘386) with evidence from Deevi et al. does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Herchenroeder (GB ‘386) with evidence from Deevi et al., in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page

5346, column 1).

In regards to claim 6, Herchenroeder (GB '386) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (page 1, lines 12-25, page 1,line 43 – page 2, line 38). The table below provides the relative comparison of the alloy disclosed by Herchenroeder (GB '386) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Herchenroeder (GB '386) with evidence from Deevi et al. (weight percent)	Overlap (weight percent)
C	0.03 – 0.2	0 – 1	0.03 – 0.2
Si	0.1 – 2.5	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0.5 – 2.0	0.5 – 2.0
Ni + Co	40 – 52	38 – 72	38 – 52
Cr	30 – 40	15 – 29	-
Mo	0 – 3.0	0 – 5	0 – 3.0
Zr+Ti+Nb+Hf	0.01 – 7.5	0 – 2.0	0.01 – 2.0
W	0 – 1.0	0 – 5	0 – 1.0
N	0.001 – 0.5	0.013	0.013
O	0.001 – 0.7	0.013	0.013
Fe	Balance	12 – 35	Balance

The Examiner notes that the amounts of carbon, silicon, manganese, nickel, cobalt, molybdenum, zirconium, titanium, niobium, hafnium, tungsten, nitrogen, oxygen and iron disclosed by Herchenroeder (GB '386) with evidence from Deevi et al. overlaps the claimed amounts of carbon, silicon, manganese, nickel, cobalt, molybdenum, zirconium, titanium, niobium, hafnium, tungsten, nitrogen, oxygen and iron of the instant invention. With respect to the claimed range of chromium, It has been held that "a prima facie case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have

the same properties." MPEP 2144.05 I.

Herchenroeder (GB ‘386) with evidence from Deevi et al. discloses a nickel-chromium-iron superalloy composition having niobium, titanium and zirconium present as shown above, but Herchenroeder (GB ‘386) with evidence from Deevi et al. does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Herchenroeder (GB ‘386) with evidence from Deevi et al., in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 8, Herchenroeder (GB ‘386) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (page 1, lines 12-25, page 1,line 43 – page 2, line 38). The table on the following page provides the relative comparison of the alloy disclosed by Herchenroeder

(GB ‘386) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Herchenroeder (GB ‘386) with evidence from Deevi et al. (weight percent)	Overlap (weight percent)
C	0.03 – 0.2	0 – 1	0.03 – 0.2
Si	0.1 – 2.5	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0.5 – 2.0	0.5 – 2.0
Ni + Co	30 – 47	38 – 72	38 – 47
Cr	19 – 22	15 – 29	19 – 22
Mo	0 – 3.0	0 – 5	0 – 3.0
Zr+Ti+Nb+Hf	0.01 – 7.5	0 – 2.0	0.01 – 2.0
W	0 – 1.0	0 – 5	0 – 1.0
N	0.001 – 0.5	0.013	0.013
O	0.001 – 0.7	0.013	0.013
Fe	Balance	12 – 35	Balance

Still regarding claim 8, Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 9, Herchenroeder (GB ‘386) discloses 0 to 1.0 weight percent carbon, which reads on the range of 0.3 to 0.5 weight percent carbon, as instantly claimed.

In regards to claim 10, Herchenroeder (GB ‘386) discloses 0 to 1.0 weight percent carbon, which overlaps the range of 0.03 to 0.2 weight percent carbon as instantly claimed.

In regards to claim 11, Herchenroeder (GB ‘386) discloses 0 to 1.0 weight percent carbon and 0 to 2 weight percent hafnium, which overlap the ranges of 0.3 to 0.6 weight percent carbon and 0.01 to 3 weight percent hafnium, as instantly claimed.

In regards to claim 12, Herchenroeder (GB ‘386) discloses 0 to 1.0 weight percent carbon and 0 to 2.0 weight percent hafnium, which read on the ranges of 0.3 to 0.6 weight percent carbon and 0.1 to 1.0 weight percent hafnium as instantly claimed.

In regards to claim 13, Herchenroeder (GB ‘386) discloses 0 to 1.0 weight percent carbon and 0 to 2.0 weight percent hafnium, which read on the ranges of 0.3 to 0.6 weight percent carbon and 0.2 to 0.5 weight percent hafnium as instantly claimed.

In regards to claim 15, Herchenroeder (GB ‘386) discloses 0 to 0.22 weight percent aluminum and 0 to 2 weight percent hafnium, which overlap the ranges of 0.1 to 10 weight percent aluminum and 0.01 to 4.5 weight percent hafnium as instantly claimed.

In regards to claim 16, Herchenroeder (GB ‘386) discloses 0 to 0.22 weight percent aluminum and 0 to 2 weight percent hafnium, which overlap the ranges of 0.1 to 6 weight percent aluminum and 0.1 to 1.0 weight percent hafnium as instantly claimed.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herchenroeder (GB 1 373 386) in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

In regards to claim 2, Herchenroeder (GB ‘386) discloses a nickel-chromium-iron alloy composition having high hot strength (page 1, lines 12-25, page 1,line 43 – page 2, line 38). The table on the following page provides the

relative comparison of the alloy disclosed by Herchenroeder (GB ‘386) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Herchenroeder (GB ‘386) (weight percent)	Overlap (weight percent)
C	0.01 – 0.5	0 – 1	0.01 – 0.5
Si	0.1 – 2.5	0.2 – 2.5	0.2 – 2.5
Mn	0 – 2.5	0.5 – 2.0	0.5 – 2.0
Ni + Co	15 – 52	38 – 72	38 – 52
Cr	20 – 40	15 – 29	20 – 29
Mo	0 – 1.0	0 – 5	0 – 1.0
Zr+Ti+Nb+Hf	0.01 – 8.2	0 – 2.0	0.01 – 2.0
W	0 – 4.0	0 – 5	0 – 4.0
Al	0 – 15	0 – 0.22	0 – 0.22
Fe	Balance	12 – 35	Balance

Herchenroeder (GB ‘386) discloses a nickel-chromium-iron alloy composition that would be made by melting and casting (page 2, lines 39-65 and Examples I-II) as shown above, but Herchenroeder (GB ‘386) does not specify the amounts of impurities (nitrogen and oxygen) that would be expected from casting.

Herchenroeder (GB ‘386) discloses a nickel-chromium-iron alloy as shown above, but Herchenroeder (GB ‘386) does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as

disclosed by Herchenroeder (GB '386), in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Claims 1, 3-4, 7-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yabuki et al. (JP 60-026644) with evidence from Deevi et al. (Exo-Melt^{TM} process for melting and casting intermetallics).in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

In regards to claim 1, Yabuki et al. (JP '644) discloses a nickel-chromium-iron alloy composition having superior properties at high temperatures (abstract). The table below provides the relative comparison of the alloy disclosed by Yabuki et al. (JP '644) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Yabuki et al. (JP '644) (weight percent)	Overlap (weight percent)
C	0.01 – 0.7	0.1 – 0.6	0.1 – 0.6
Si	0.1 – 3.0	0.1 – 3.0	0.1 – 3.0
Mn	0 – 2.5	0.1 – 2.0	0.1 – 2.0
Ni	15 – 90	5 – 30	15 – 30
Cr	5 – 40	15 – 33	15 – 33
Mo	0 – 3.0	0 – 5	0 – 3.0
Nb	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Hf	0.01 – 4.5	0.001 – 0.45	0.01 – 0.45
Ta	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Ti	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Zr	0 – 2.0	0	0
Co	0 – 2.0	0	0
W	0 – 4.0	0	0
Al	0 – 15	0	0
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	Balance	Balance

Yabuki et al. (JP ‘644) discloses a nickel-chromium-iron alloy composition that would be made by melting and casting (abstract and page 4, lines 1-3) as shown above, but Yabuki et al. (JP ‘644) does not specify the amounts of impurities (nitrogen and oxygen) that would be expected from casting.

Deevi et al. discloses nickel-based alloys having high temperature corrosion made by melting and conventional casting techniques that would have 0.013 weight percent oxygen and 0.013 weight percent nitrogen (page 17, column 2 and page 25, column 2).

Therefore, it would be expected that the nickel-chromium-iron alloy made by melting and casting, as disclosed by Yabuki et al. (JP ‘644), would also have 0.013 weight percent oxygen and 0.013 weight percent nitrogen, as disclosed by Deevi et al., because Deevi et al. teaches that melting and conventional casting would result in the occurrence of impurities such as oxygen and nitrogen in the above specified amounts (page 17, column 2 and page 25, column 2).

Yabuki et al. (JP ‘644) with evidence from Deevi et al. discloses an alloy composition having niobium, and/or titanium present as shown above, but Yabuki et al. (JP ‘644) with evidence from Deevi et al. does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to alloys that would be used in high temperature environments such as turbines in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Yabuki et al. (JP ‘644) with evidence from Deevi et al., in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 3 Yabuki et al. (JP ‘644) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (abstract and page 4, lines 1-3). The table below provides the relative comparison of the alloy disclosed by Yabuki et al. (JP ‘644) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Yabuki et al. (JP ‘644) (weight percent)	Overlap (weight percent)
C	0.01 – 0.7	0.1 – 0.6	0.1 – 0.6
Si	0.1 – 2.5	0.1 – 3.0	0.1 – 3.0
Mn	0 – 2.5	0.1 – 2.0	0.1 – 2.0
Ni	30 – 40	5 – 30	15 – 30
Cr	20 – 30	15 – 33	15 – 33
Mo	0 – 3.0	0 – 5	0 – 3.0
Nb	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Hf	0.01 – 4.5	0.001 – 0.45	0.01 – 0.45
Ta	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Ti	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Zr	0 – 2.0	0	0
Co	0 – 2.0	0	0
W	0 – 4.0	0	0
Al	0 – 15	0	0
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	Balance	Balance

Still regarding claim 3, Ritzert et al. discloses adding high purity fine

particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 4, Yabuki et al. (JP '644) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (abstract and page 4, lines 1-3). The table below provides the relative comparison of the alloy disclosed by Yabuki et al. (JP '644) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Yabuki et al. (JP '644) (weight percent)	Overlap (weight percent)
C	0.03 – 0.2	0.1 – 0.6	0.1 – 0.2
Si	0.1 – 0.25	0.1 – 3.0	0.1 – 0.25
Mn	0 – 2.5	0.1 – 2.0	0.1 – 2.0
Ni	30 – 40	5 – 30	30
Cr	20 – 30	15 – 33	20 – 30
Mo	0 – 3.0	0 – 5	0 – 3.0
Nb	0 – 1.7	0.1 – 3.0	0.1 – 1.7
Hf	0.01 – 4.5	0.001 – 0.45	0.01 – 0.45
Ta	0 – 0.5	0.1 – 3.0	0.1 – 0.5
Ti	0 – 0.5	0.1 – 3.0	0.1 – 0.5
Zr	0 – 0.5	0	0
Co	0 – 2.05	0	0
W	0 – 1.0	0	0
Al	0 – 15	0	0
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	Balance	Balance

Still regarding claim 4, Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to superalloys that would be used in high temperature environments in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and

page 5346, column 1).

In regards to claim 7, Yabuki et al. (JP ‘644) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (abstract and page 4, lines 1-3). The table below provides the relative comparison of the alloy disclosed by Yabuki et al. (JP ‘644) with the alloy of the instant invention.

Element	Instant Claims (weight percent)	Yabuki et al. (JP ‘644) (weight percent)	Overlap (weight percent)
C	0.3 – 0.7	0.1 – 0.6	0.3 – 0.6
Si	0.01 – 2.5	0.1 – 3.0	0.1 – 2.5
Mn	0 – 2.5	0.1 – 2.0	0.1 – 2.0
Ni	19 – 22	5 – 30	19 – 22
Cr	24 – 27	15 – 33	24 – 27
Mo	0 – 3.0	0 – 5	0 – 3.0
Nb	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Hf	0.01 – 4.5	0.001 – 0.45	0.01 – 0.45
Co	0 – 2.0	0	0
W	0 – 1.0	0	0
Al	0 – 15	0	0
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	Balance	Balance

Deevi et al. discloses nickel-based alloys having high temperature corrosion made by melting and conventional casting techniques that would have 0.013 weight percent oxygen and 0.013 weight percent nitrogen (page 17, column 2 and page 25, column 2).

Therefore, it would be expected that the nickel-chromium-iron alloy made by melting and casting, as disclosed by Yabuki et al. (JP ‘644), would also have 0.013 weight percent oxygen and 0.013 weight percent nitrogen, as disclosed by Deevi et al., because Deevi et al. teaches that melting and conventional casting

would result in the occurrence of impurities such as oxygen and nitrogen in the above specified amounts (page 17, column 2 and page 25, column 2).

Yabuki et al. (JP '644) with evidence from Deevi et al. discloses an alloy composition having niobium present as shown above, but Yabuki et al. (JP '644) with evidence from Deevi et al. does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to alloys that would be used in high temperature environments such as turbines in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Yabuki et al. (JP '644) with evidence from Deevi et al., in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 8, Yabuki et al. (JP '644) with evidence from Deevi et al. discloses a nickel-chromium-iron alloy composition having high hot strength (abstract and page 4, lines 1-3). The table on the following page provides the relative comparison of the alloy disclosed by Yabuki et al. (JP '644) with the alloy

of the instant invention.

Element	Instant Claims (weight percent)	Yabuki et al. (JP ‘644) (weight percent)	Overlap (weight percent)
C	0.03 – 0.2	0.1 – 0.6	0.1 – 0.2
Si	0.01 – 2.5	0.1 – 3.0	0.1 – 2.5
Mn	0 – 2.5	0.1 – 2.0	0.1 – 2.0
Ni	30 – 45	5 – 30	30
Cr	19 – 22	15 – 33	19 – 22
Mo	0 – 3.0	0 – 5	0 – 3.0
Nb	0 – 2.0	0.1 – 3.0	0.1 – 2.0
Hf	0.01 – 4.5	0.001 – 0.45	0.01 – 0.45
Ti	0 – 0.5	0.1 – 3.0	0.1 – 0.5
Zr	0 – 0.5	0	0
Co	0 – 2.0	0	0
W	0 – 1.0	0	0
Al	0 – 15	0	0
N	0.001 – 0.5	-	-
O	0.001 – 0.7	-	-
Fe	Balance	Balance	Balance

Deevi et al. discloses nickel-based alloys having high temperature corrosion made by melting and conventional casting techniques that would have 0.013 weight percent oxygen and 0.013 weight percent nitrogen (page 17, column 2 and page 25, column 2).

Therefore, it would be expected that the nickel-chromium-iron alloy made by melting and casting, as disclosed by Yabuki et al. (JP ‘644), would also have 0.013 weight percent oxygen and 0.013 weight percent nitrogen, as disclosed by Deevi et al., because Deevi et al. teaches that melting and conventional casting would result in the occurrence of impurities such as oxygen and nitrogen in the above specified amounts (page 17, column 2 and page 25, column 2).

Yabuki et al. (JP ‘644) with evidence from Deevi et al. discloses an alloy composition having titanium and/or zirconium present as shown above, but

Yabuki et al. (JP ‘644) with evidence from Deevi et al. does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to alloys that would be used in high temperature environments such as turbines in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Yabuki et al. (JP ‘644) with evidence from Deevi et al., in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

In regards to claim 9, Yabuki et al. (JP ‘644) discloses 0.1 to 0.6 weight Percent, which overlaps reads on the range of 0.3 to 0.5 weight percent carbon, as instantly claimed.

In regards to claim 10, Yabuki et al. (JP ‘644) discloses 0.1 to 0.6 weight percent carbon, which overlaps the range of 0.03 to 0.2 weight percent carbon as instantly claimed.

In regards to claim 11, Yabuki et al. (JP ‘644) discloses 0.1 to 0.6 weight percent carbon and 0.001 to 0.45 weight percent hafnium, which read on the

ranges of 0.3 to 0.6 weight percent carbon and 0.01 to 3 weight percent hafnium, as instantly claimed.

In regards to claim 12, Yabuki et al. (JP ‘644) discloses 0.1 to 0.6 weight percent carbon and 0.001 to 0.45 weight percent hafnium, which read on the ranges of 0.3 to 0.6 weight percent carbon and 0.1 to 1.0 weight percent hafnium, as instantly claimed.

In regards to claim 13, Yabuki et al. (JP ‘644) discloses 0.1 to 0.6 weight percent carbon and 0.001 to 0.45 weight percent hafnium, which read on the ranges of 0.3 to 0.6 weight percent carbon and 0.2 to 0.5 weight percent hafnium, as instantly claimed.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yabuki et al. (JP 60-026644).in view of Ritzert et al. (Single crystal fibers of yttria-stabilized cubic zirconia with ternary oxide additions).

Yabuki et al. (JP ‘644) discloses a nickel-chromium-iron alloy composition having superior properties at high temperatures (abstract). The table below provides the relative comparison of the alloy disclosed by Yabuki et al. (JP ‘644) with the alloy of the instant invention.

Element	**Instant Claims (weight percent)**	**Yabuki et al. (JP ‘644) (weight percent)**	**Overlap (weight percent)**
C	0.01 – 0.5	0.1 – 0.6	0.1 – 0.5
Si	0.1 – 2.5	0.1 – 3.0	0.1 – 2.5
Mn	0 – 2.5	0.1 – 2.0	0.1 – 2.0
Ni	15 – 50	5 – 30	15 – 30
Cr	20 – 40	15 – 33	20 – 33
Mo	0 – 1.0	0 – 5	0 – 1.0
Nb	0 – 1.7	0.1 – 3.0	0.1 – 1.7
Hf	0.01 – 4.5	0.001 – 0.45	0.01 – 0.45
Ti	0 – 0.5	0.1 – 3.0	0.1 – 0.5
Zr	0 – 0.5	0	0

Element	Instant Claims (weight percent)	Yabuki et al. (JP ‘644) (weight percent)	Overlap (weight percent)
Co	0 – 2.0	0	0
W	0 – 1.0	0	0
Fe	Balance	Balance	Balance

Yabuki et al. (JP ‘644) discloses an alloy composition having titanium and niobium present as shown above, but Yabuki et al. (JP ‘644) does not specify "that at least part of the hafnium is present as finely divided oxide particles".

Ritzert et al. discloses adding high purity fine particles such as hafnium oxide to alloys that would be used in high temperature environments such as turbines in order to improve high temperature reinforcement (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added high purity fine particles such as hafnium oxide, as disclosed by Ritzert et al., to the high temperature alloy, as disclosed by Yabuki et al. (JP ‘644), in order to improve high temperature reinforcement, as disclosed by Ritzert et al. (abstract; page 5339, column 1; page 5341, column 1; page 5344, column 1; and page 5346, column 1).

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1-3, 11, 15 and 16-19 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 42-44, 49 and 52-57 of copending Application No. 10/533,034. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 4-8, 12-14 and 18-19 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 45, 48, 50-51, and 60 of copending Application No. 10/533,034. Although

the conflicting claims are not identical, they are not patentably distinct from each other.

With respect to the compositions of claims 4-8, the compositions of these claims can be selected from the compositions taught in claims 45 and 48.

With respect to claims 12-14, claim 49 of copending Application No. 10/533,034 teaches “in which the amount of carbon in the alloy, by weight, is from 0.3 to 0.6%" which would by dependence also be present with the hafnium ranges in claims 50-51 thereby being obvious with respect to the ranges of carbon and hafnium in claims 12-14 of the instant application.

With respect to claims 18-19 which require "an average particle size of from 50 microns to 0.25 microns, or less." and "having an average particle size of from 5 microns to 0.25 microns, or less.", this would overlap the limitation “wherein the hafnium particlses have a particle size of less than 50 microns” of claim 60.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

JR